

TWO NEW OPERCULATE LAND SNAILS FROM THE PALAU ARCHIPELAGO

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Abstract.—*Georissa zea* Thompson, n. sp. (Gastropoda, Prosobranchia, Hydrocenidae) is described from Machachar Island. It differs from other species by its large size and regularly-spaced granular sculpture. It is the first hydrocenid recorded from the Palau Archipelago. A second species, *G. rufula*, also occurs there. *Pupina nitidula* Thompson, n. sp. (Gastropoda, Prosobranchia, Pupinidae) is described from Ngeruktabel Island. It is differentiated by its small size and slender form.

The land snail fauna of the Palau Islands is better known than that of most other western Pacific archipelagos. Four of the six numerically dominant groups of snails inhabiting the islands have been monographed in recent years, based primarily upon collections made by the Bernice P. Bishop Museum Micronesia Expedition in 1936 (Baker 1938-1941; Clench 1949; Cooke and Kondo 1960; Solem 1976, 1983). Notwithstanding these revisionary studies, the fauna remains only partially known, even among those families that are monographed. Species have been reported from only six of the nearly 200 islands that comprise the archipelago, and only two (Koror and Peleliu) have been sampled at more than a few stations.

Recent field work in Palau by the authors has added important collections from seventeen other islands and islets not reported upon in earlier studies. The new snails described below are from two of these islands.

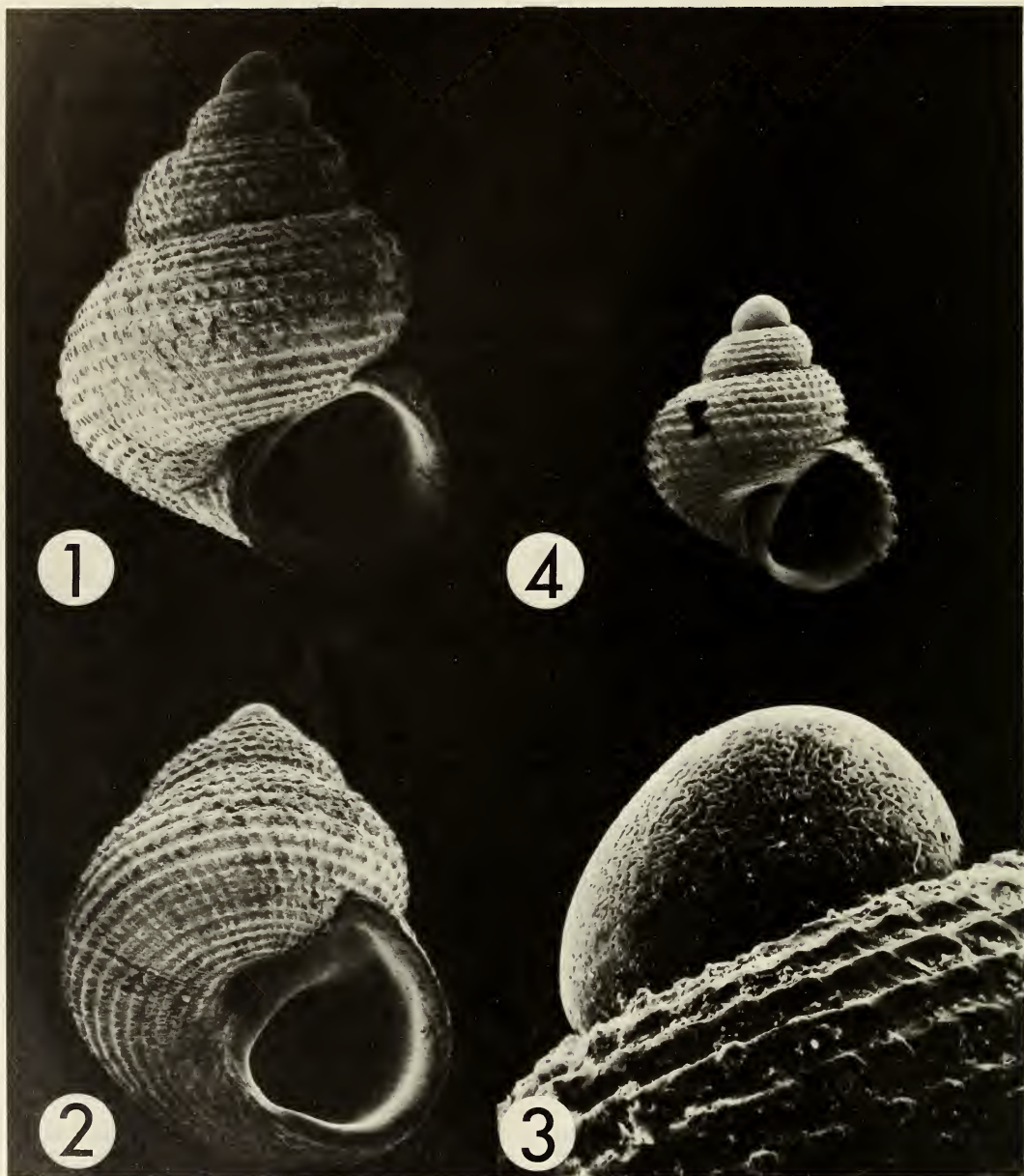
Georissa zea Thompson, new species

Figs. 1-4

Diagnosis.—A moderately large species characterized by its light yellow color, its ovate-turbinata shape, and teleoconch sculpture consisting of strong spiral cords bearing nodes that are synchronized along growth lines.

Description.—Shell light yellow in color. Moderately thick, opaque. About 6.5 mm long at maturity. Ovate-turbinata in shape (Fig. 1); about 1.4 times as wide as high in adult shells. Spire moderately high, about 1.4 times height of aperture. Whorls 4.2. Protoconch strongly protruding; sculptured with dense mesh of minute longitudinal granules (Fig. 3); initial half whorl horizontal, 0.30 mm wide by 0.40 mm long. Whorls of teleoconch uniformly rounded with deeply impressed suture; sculptured with strong spiral cords adorned with regularly-spaced rounded nodes synchronized along growth lines; cords and nodes nearly uniform in size over surface of shell; 19 cords on body whorl, 10 on penultimate whorl and 8 on antipenultimate whorl. Umbilicus closed but deeply indented with narrow rimate impression at maturity (Fig. 2). Columellar lip rounded, not forming broad, flattened plate. Immature shells imperforate; with broad plate-like expansion of columella, typical of *Georissa* (Fig. 4). Aperture broadly ovate-triangular in shape; 0.9 times as high as wide. Peristome continuous across parietal wall; thickened along posterior corner; basal lip and columellar lip nearly straight and forming pronounced angle; baso-columellar corner sharp and weakly projecting forward.

Inner surface of holotype operculum with thick calcereous peg projecting to right and attached to plate to margin. (The peg was



Figs. 1–4. *Georissa zea* Thompson, new species: 1–3, Holotype (UF 90523); 4, Paratype (UF 90524). Enlargements: 1, 2, 4 \times 26; 3 \times 175.

broken at this point in the only specimen available.) Outer face paucispiral; nucleus located at left-basal margin. Outer surface covered with thin calcareous layer. Basal plate surrounded by a chitinous fringe. Basal plate 0.86 mm wide and 1.15 mm high.

Measurements in mm of two specimens follow.

Specimen	length	width	aper. h.	aper. w.	whorls
Holotype	6.45	4.71	2.73	2.54	4.2
Paratype	3.41	2.73	1.67	1.80	3.3

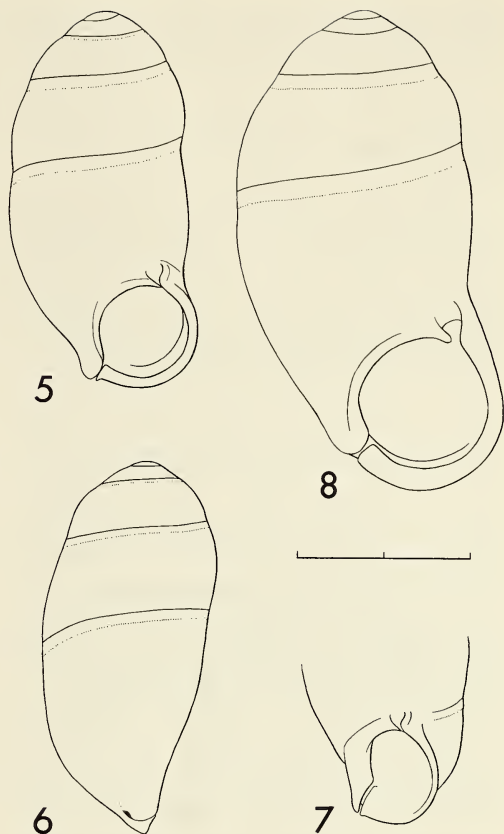
Type locality.—Republic of Belau (Palau Islands), northwest point of Machachar Island, 134°22'20"E, 07°08'45"N. HOLOTYPE: UF 90523; collected 22 Oct 1985 by Fred G. Thompson. PARATYPE: UF

90524; same data as holotype. The holotype and paratype were gold-plated for SEM study.

The area at the type locality consists of a strongly karsted limestone terrain in a primary rainforest with a sparse understory of woody shrubs and vines. The ground was covered with a thin layer of dead leaves. The holotype, the only live specimen found, was on the underside of a rotting piece of wood. The single paratype was found in leaf litter.

Remarks.—This species is unique among *Georissa* because of its sculpture. The umbilical indentation of the holotype is also unique. All other *Georissa* are imperforate and have a broad plate-like columellar lip as is depicted in Fig. 4. The umbilical pit of the holotype may be a gerontic teratology. It appears to be caused by rolling of the columella. Notwithstanding the structure of the umbilical area this species is readily identified by its sculpture and its size. It is the largest *Georissa* known from the Pacific or the Philippine Islands.

This is the first species of Hydrocenidae recorded from the Palau Islands. A second species that was originally described from Panope, *Georissa rufula* Moellendorff, 1900, is widely distributed in the Palau Archipelago. It is distinguished from *G. zea* by its minute size, being about 2.5 mm long, and its smooth reddish shell that is sculptured with very fine spiral striations. Usually, the striations are apparent only on fresh shells. Zilch (1973, pl. 13, fig. 22) illustrates the lectotype of *G. rufula*. Both species were found together on Manchachar Island. *Georissa rufula* also inhabits leaf-litter. Three other species, *G. elegans* Quadras and Moellendorff, 1894, *G. biangulata* Quadras and Moellendorff, 1894, and *G. laevigata* Quadras and Moellendorff, 1894, are described from Guam. Numerous other species are known from the Philippine Islands, southeast Asia, Indonesia, Australia and various south Pacific islands. None of these has sculpture that is similar to that of *G. zea*.



Figs. 5–8. 5–7, *Pupina nitidula* Thompson, new species, holotype (UF 79186). 8, *Pupina difficilis* Semper (UF 84348), Peleliu Island, Klouklklubed. Scale equals 2 mm.

Etymology.—The species name *zea* is taken from the generic name for maize, *zea*, and alludes to the noded sculpture arranged in rows much like kernels on a corncob.

Pupina nitidula Thompson, new species
Figs. 5–7

Diagnosis.—A species of *Pupina* s.s. that is not closely related to other known species of the genus. It is characterized by its small size, slender shape, and notches in the peristome. The small, slender, transparent shell is flexed weakly to the left at the third whorl. The palatal lip inserts on the front of the shell (Fig. 5), not on the side as in other members of *Pupina* s.s. such as *P. difficilis* Semper. The posterior corner of the aper-

ture has a nearly tubular channel formed by the parietal tooth and a tubercular projection on the palatal lip. The columellar pore lies deep behind the columella and is connected to the peristome by a narrow oblique slit.

Description.—Shell small, about 4.5 mm long; ovate-cylindrical in shape with rounded apex. Shell weakly flexed to left at third whorl (Fig. 5). Slender, 0.46–0.51 times as wide as high. Surface smooth and glossy; transparent; grayish white. Whorls 4.8–4.9; weakly arched between sutures. Penultimate whorl flattened above front of aperture. Suture weakly impressed with distinct hyaline subsutural zone. Aperture circular, 0.49–0.51 times width of shell. Peristome nearly continuous across parietal wall as low rounded callus merging into parietal lamella at base. Peristome lying in plane with anterior slope of penultimate whorl (Fig. 6). Peristome incised by parietal sinus and columellar pore (Fig. 7). Parietal sinus formed by oblique parietal lamella extending into aperture for about $\frac{1}{8}$ whorl forming narrow channel along posterior corner of aperture; upper end of palatal lip with tubercular projection partially overlapping outer edge of parietal lamella. Parietal lamella not extending beyond edge of aperture. Columellar pore located at base of columella, consisting of small elliptical pore connected to margin of peristome by deep, narrow, oblique slit (Fig. 6). Pore nearly vertical and opening internally behind flattened columellar wall.

Measurements in mm of three specimens are as follows. The aperture is measured internally.

	length	width	aper. h.	aper. w.	whorls
Holotype ¹	4.46	2.29	1.05	1.12	4.9
Paratype ²	4.40	2.11	0.99	1.05	4.9
Paratype ³	4.46	2.05	1.05	1.05	4.8

¹ UF 79186; ² UF 79187; ³ UF 79188.

Type locality.—Republic of Belau (Palau Islands), southeast end of Ngeruktabel Island, 134°26'50"E, 07°15'30"N; 150 m al-

titude. The type locality is 1 km north of the ruins of a World War II Japanese artillery installation, and is just a few meters below the crest of the island on the east slope. The area is on limestone substrate covered by rain forest with very little understory or ground vegetation. Specimens were found deep in leaf-litter in association with *Pupina difficilis* Semper. HOLOTYPE: UF 79186; collected 23 Oct 1985 by Fred G. Thompson. PARATYPES: UF 79187, UF 79188; same data as holotype.

Pupina nitidula is known only from the type locality. Ngeruktabel is a long narrow crescent-shaped island about 30 km long and 1–2 km wide. The island is uninhabited. It is accessible only at a few points along the shore, because it is surrounded by nearly continuous vertical cliffs. Six field collections were made by the authors and Jeffry Bozanic from the east end of Ngeruktabel over a linear distance of less than five km. The central region is higher and broader. It has not yet been explored for land snails.

Remarks.—*Pupina nitidula* is readily identified by its small size, its slender shape with a rounded apex, and its aperture notches. It is the smallest known *Pupina* s.s. It is not closely related to other known species because of the structure of the aperture. In other species the embayment between the parietal lamella and the palatal lip is broader, the palatal lip inserts in a more lateral position, and the columellar pore is broader with a more rounded perforation connected to the edge of the peristome by a horizontal transverse slit. These characters are typically depicted in *Pupina difficilis* Semper. Clench (1949) illustrates all of the known Pacific *Pupina*, including the type species, *Pupina keradreni* Vignard. None approaches *Pupina nitidula* in the characters of the aperture.

Pupina nitidula is most similar to *Pupina difficilis* because of its bluntly rounded apex. *Pupina difficilis* is widely distributed throughout the Palau Islands, and is the only other *Pupina* from there. It was found with *Pupina nitidula* at the type locality.

Etymology.—The species name *nitidula* is from the Latin *nitidus*, diminutive, and refers to the elegant, shiny aspect of this small snail.

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